AMENDMENTS TO THE CLAIMS:

The listing of claims will replace all prior versions and listings of claims in the application.

Listing of Claims:

1. (Currently Amended) A process for the manufacture of carbon nanostructures, the carbon nanostructures being selected from carbon nanotubes and carbon nano-onions, ~~the method~~ comprising the steps of ~~injecting a carbon-containing gas into a plasma flame generated from a plasma forming gas to provide atomic carbon, which in the presence of in situ generated nanometer-sized metal catalyst particles that act as nucleation points for growth of carbon nanostructures, produce the carbon nanostructures, and collecting the carbon nanostructures~~.

a) providing a high enthalpy metal electrode generated direct current thermal plasma torch having a plasma forming gas feed and a cooled nozzle attached thereto, the torch being connected to a cooled reactor having a quenching zone downstream of the plasma torch for the formation of carbon nanostructures;

b) selecting a catalyst metal and providing the catalyst metal to the plasma stream, selecting a torch power at a level of from about 30 kW up to a multi-megawatt level, selecting a flow rate for the plasma forming gas feed, and selecting the reactor pressure so as to provide a plasma torch stream temperature required to vaporize and maintain the selected catalyst metal in the vapor state;

c) providing a feed of a carbon containing substance and a carrier gas at a selected flow rate to the plasma stream, and

d) the resulting plasma stream containing carbon, carrier gas and metal vapor entering the quenching zone of carbon nanostructure formation, whereupon metal catalyst nanoparticles acting as nucleation sites and catalyst for the growth of carbon nanostructures are generated *in situ* in a diameter range of from about 2 to about 30 nm from the metal catalyst vapor, which, with atomic carbon from the carbon containing substance, form such structures in a diameter range of from about 2 to about 30 nm , which carbon nanostructures are then collected.

2. **(Cancelled)**

3. **(Currently Amended)** A process as claimed in claim ~~[2]~~1 wherein the carrier gas and the plasma forming gas are each selected from helium, argon, nitrogen and air, and they are the same or different.

4. **(Previously Cancelled)**

5. **(Previously Cancelled)**

6. **(Currently Amended)** A process as claimed in claim [4] 1 wherein the carbon-containing gas substance is tetrachloroethylene.

7. (Cancelled)

8. **(Currently Amended)** A process as claimed in claim ~~[7]~~ 1 wherein the catalyst metal ~~electrode~~ is selected from iron, tungsten, nickel, cobalt, chromium, molybdenum, palladium, platinum, ruthenium, rhodium, hafnium, gadolinium, ~~electrodes~~ and combinations thereof ~~or copper electrodes with one or more of such metals~~ in the form of an electrode coated with one or more of such catalyst metals, in the form of powders of one or more of such catalyst metals and particles of one or more of such catalyst metals.

9. **(Currently Amended)** A process as claimed in claim [7] 8 wherein a tungsten electrode is used.

10. **(Original)** A process as claimed in claim 9 wherein a tungsten nozzle is used.

11. **(Currently Amended)** A process as claimed in claim ~~[7]~~ 1 wherein the amount of catalyst nanoparticles and of carbon-containing substance are controlled independently

12. **(Currently Amended)** A process as claimed in claim 11 wherein the metal vapor content in the plasma stream is controlled by the electric arc current in the plasma torch and the quantity of carbon in the system is controlled by the carbon source gas

volumetric flow.

13. **(Currently Amended)** A process as claimed in claim 1 wherein the catalyst is derived from at least one metal powder injected into the outlet ~~flame~~ stream of the torch.

14. **(Currently Amended)** A process as claimed in claim 1 wherein the catalyst is generated from droplets of metal generated from a metal sample brought into contact with the ~~flame~~ stream.

15. **(Previously Cancelled)**

16. **(Previously Cancelled)**

17. **(Previously Cancelled)**

18. **(Previously Cancelled)**

19. **(Cancelled)**

20. **(Cancelled)**

21. **(Cancelled)**

22. **(Currently Amended)** A process as claimed in claim 1 wherein the carbon-containing substance is selected from at least one of liquid hydrocarbons vaporized before injection, liquid hydrocarbons ~~or~~ vaporized by the thermal plasma after injection in the high enthalpy thermal plasma torch, and gaseous hydrocarbons~~, and solid carbon particles injected along with a carrier gas~~.

23. **(New)** A process as claimed in claim 8, wherein the electrode is a copper electrode coated with one or more of such catalyst metals.

24. **(New)** A process for the manufacture of carbon nanostructures, the carbon

nanostructures being selected from carbon nanotubes and carbon nano-onions, comprising the steps of

a) providing a high enthalpy metal electrode generated direct current thermal plasma torch having a plasma forming gas feed and a cooled nozzle attached thereto, the cooled nozzle having a carbon containing substance and carrier gas feed, the torch being connected to a cooled reactor having a quenching zone downstream of the plasma torch for the formation of carbon nanostructures;

b) selecting a catalyst metal, selecting the torch power at a level of from about 30 kW up to a multi-megawatt level, selecting the flow rates of the plasma forming gas feed and the carbon containing substance and carrier gas feed, and selecting the reactor pressure so as to provide a plasma torch temperature required to vaporize the catalyst metal and maintain the catalyst metal in vapor form, the plasma stream expansion at the nozzle exit and the downstream quenching zone allowing cooling of the plasma stream to generate *in situ* nanometer sized metal catalyst particles, which act as catalyst and nucleation sites for the formation of carbon nanostructures; and

c) injecting the carbon-containing substance and carrier gas into the nozzle at a feed rate that allows the formation of atomic carbon, and injecting the resulting plasma stream seeded with atomic carbon and metal vapours into the quenching zone downstream of the plasma torch which, in the presence of the nanometer sized metal catalyst particles generated, having a diameter of from about 2 to about 30nm, form carbon nanostructures having a diameter of from about 2 to about 30nm, which are then collected.

25. **(New)** A process for the manufacture of carbon nanostructures, the carbon nanostructures being selected from carbon nanotubes and carbon nano-onions, comprising the steps of

a) selecting tungsten as a catalyst metal and providing a high enthalpy tungsten-coated electrode in a direct current thermal plasma torch having an inlet for a plasma forming gas feed at a flow rate of about 100 to about 225 standard litres per minute;

b) selecting the torch power at a level of from about 30 to about 65kW and the reactor pressure at about 200 to about 800 torr, so as to provide a plasma torch temperature required to vaporize the tungsten-coated metal electrode and maintain the tungsten metal in the form of a vapor;

c) selecting a tungsten nozzle attached to the torch outlet and cooled to a temperature below 1500°C, the nozzle having a carbon containing substance and a carrier gas feed inlet and injecting the carbon-containing substance at a rate of about 0.15 mol/min with a carrier gas at a flow rate of about 20 standard litres per minute into the plasma stream from the nozzle inlet; and

d) using cooling of the plasma stream above 10^7 °C/s produced by the carbon-containing substance and carrier gas feed, and by a supersonic shock created at the exit of the nozzle or the provision of an expansion in the nozzle internal diameter, generate *in situ* nanometer sized tungsten catalyst particles having a diameter of from about 2 to about 30nm, which act as the catalyst and nucleation sites for the formation of carbon nanostructures having a diameter of from about 2 to about 30nm within the plasma stream, which are then collected.